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MEMORANDA

The Rôle of Prices in the Business Cycle

In the opinion of writers on the subject, price movements constitute an important, and in the minds of many the chief, characteristic of the business cycle. So general is this view that prices appear better fitted than any other single statistical series to serve as a first approximation to an index of business conditions. Notwithstanding the unanimity of opinion as to the general importance of prices in the cycle of business activity, however, one finds on examination of the various writings on the subject, considerable divergence of view as to just what rôle is played by prices, as to whether, for instance, price movements anticipate movements of general business activity or are concurrent in time with the business cycle, and as to whether prices in general, or special price groups, are significant. On one further point, too, there is difference of opinion, a difference characteristic of the general view of what may be regarded as two distinct groups of writers on business cycles. One group regard the business cycle (and the price cycle) as recurring automatically. Another group hold that the cycle, both of prices and of general business activity, is set going by some initial, accidental disturbance, a " fillip " of some sort, whereby in periods of depression prices and general business are given an upward turn, whereupon the cycle once again proceeds of itself through its successive phases of prosperity, exhaltation, crisis, and depression.

The purpose of the present note is to set forth the opinions regarding price movements of representative writers, in sufficient number and detail to indicate the general agreement of view that price movements are preëminently characteristic of the business cycle, and, incidentally, to indicate some of the chief differences of opinion as to the precise rôle which prices play in that cycle.

Clement Juglar, the French economist, in *Des Crises commerciales et de leur Retour periodique en France, en Angleterre, et aux Etats-Unis* defines a crisis as follows: " A crisis would be, then, *a stoppage of prices:* that is to say, the moment when one does not find more new takers." [1] Juglar's definition is cited and endorsed without qualification by the Commission appointed by the government of France to investigate economic crises — *Commission des Crises Economiques*, 1908–11. The conclusions of the Commission are indicated by a table which shows, for both general prices and prices of production materials, a marked correspondence between price movements and movements of general business activity.

First Event		Second Event		Third Event		Fourth Event		Fifth Event
Date that demand for extra construction commenced to fall off	Lapse of time	Date that demand for extra construction had about ceased	Lapse of time	Date that prices commenced to decline	Lapse of time	Date that extra construction was about completed	Lapse of time	Date that actual construction had fallen to a depression basis which attracted general attention
	Months		Months		Months		Months	
February 1899	4	June 1899	8	February 1900	2	April 1900	3	July 1900
December 1901	7	July 1902	3	October 1902	8	June 1903	5	November 1905
October 1905	10	August 1906	9	May 1907	8	January 1908	.	October 1907 *

* Panic.

It will be observed that the Commission confined itself to a study of annual data, so that its results are of little interest for purposes of comparison with the results of Dr. Persons' more refined analysis of bi-monthly data. The significance of the table for our purpose is that it indicates that in the view of the French Commission the business cycle is a price cycle. As the Commission says: — " The table, drawn up by the (official) statistical service, establishes the fact that prices, of commodities in general no less than of production goods considered separately, have attained their clearly defined maximum in years of crises. It shows also the frequent coincidence of the minima of prices with the years which mark the maximum of industrial depression." [2]

Other writers express the same general view. Mitchell's exhaustive inquiry is in terms of price movements.[3] Veblen says that " crises, depressions, hard times, dull times, brisk times, periods of speculative advance, eras of prosperity, are primarily phenomena of business; they are, in their origin and primary incidence, phenomena of price disturbance, either of decline or advance." [4] Veblen, however, regards the price cycle not as automatically recurrent, but as set in motion by some accidental disturbance during the period of depression, which in his view is the characteristic underlying condition of modern industry.[5] Brookmire says: " A comparison of a ' barometer chart ' of commodity prices with similar charts of all other business factors leads me to believe that in a well constructed index of the general level of prices we have

[1] Ed. of 1889, p. 14, italics ours. It is interesting to compare this 1889 edition with the first edition of Juglar's work, 1862. The later edition runs altogether in terms of prices, even to the chapter headings; in the first, price movements are referred to only incidentally, in scattered pages.

[2] *Ibid.*, p. 22.

[3] W. C. Mitchell, *Business Cycles*, pp. 570–578.

[4] T. Veblen, *The Theory of Business Enterprise*, p. 180.

[5] See *ibid.*, p. 194. But see, too, p. 183.

one of the best single barometers obtainable."[1] Gide says: " All crises . . . are announced by the same phenomena: increasing activity in the movement of affairs, of sales, of investments, of discounts, in the rise of prices and the course of values on the exchange. . . ."[2] Even the classical English economist, W. S. Jevons, though seeking the " cause " of business cycles in the influence of sun spots on agricultural crops, took as his index of the cycle agricultural prices.[3] Selden's discussion, also, is in price terms.[4] He distinguishes between the phenomena of the " credit system," which in his view merely increases the extent and severity of price fluctuations, and the " trade cycle," the " seesaw movement between goods and money " which results from " the effort to anticipate higher prices," and " would exist if credit were unknown."[5] As to what sets the price cycle in motion, Selden is one of those who hold some external, accidental disturbance to be necessary. Robertson's very careful study,[6] though by no means restricted to an analysis of price fluctuations, yet turns largely upon price movements, their significance, their relation to wages, money systems, and industrial, commercial, and financial factors. His concluding chapter, which contains suggestions for remedies of industrial crises and depressions, is largely a discussion of possible price regulation. His view as to the concurrence of price movements and movements of general activity is shown by such phrases as " the falling price level immediately consequent on the crisis. . . ."[7]

Finally, we have the views of Aftalion. His two-volume work, *Les Crises pėriodiques de Surproduction*[8] is altogether in terms of prices. It begins with the statement that " the problem of crises is principally the problem of periodic movements of prices." Aftalion first makes an examination of index numbers of general prices " selected from the best numbers existent in England, France, Germany, and the United States," for the period 1847–1912.[9] He concludes from his study of index numbers of commodity prices that " in the fluctuations of prices certain facts are repeated identically with great regularity; others recur with considerable frequency; still others are very variable. . . . The most constant phenomenon is the alternation of several years of high prices with several years of low prices. . . . The two alternating phases form together a cycle. The repetition of these cycles permits them to be considered as periodic cycles. This (the price cycle) is the chief example of that remarkable periodicity of economic movements of which in later pages numerous illustrations will be found."[10] In Aftalion's view the price cycle is synchronous with the wave movements of general business activity: " The maximum price and the minimum price are thus at the two turning points of the periodic cycle. . . ."[11] After enumerating the dates of crises between 1897 and 1907, he declares that " in general, these dates are at the intersection of the periods of the rise and the fall of prices. In general also, the last year of the rise of prices, the year of the price maxima, has been the year of the crisis; the rise in the first months of the year, before the crisis, has more than compensated for the marked fall . . . in the months after the crisis, especially since crises have broken out most often towards autumn."[12] This last sentence indicates that Aftalion regards the concurrence of prices and of the business cycle as holding true not merely for annual data, but for monthly data. In judging of the worth of his conclusions on this point, however, it must be stated that Aftalion's study is based almost entirely on annual data. " There can be no question," he says, " in a matter so vast and complex, of following the detail of the oscillations (of prices) within the year. Recourse will be had only in exceptional cases to quarterly or monthly data. Usually, moreover, only annual data are available."[13] Dr. Persons' investigations, on the other hand, have shown that even the quarter is too long an interval to establish the sequence between the different series of statistics which comprise the business cycle.[14]

Attention should be called to the fact that it is *general* prices which Aftalion finds significant. This judgment is based on an examination of a considerable number of special price groups, from which Aftalion concludes that, on the whole, these display the same characteristic movements as the indices of general prices.[15]

All of the writers thus far mentioned speak of general prices. Moreover, though it is in some cases difficult to ascertain the fact with certainty, they all appear to regard the price cycle as concurrent in time with the cycle of general business activity. In virtually every case, in fact, they state the latter in terms of the former, and thus indicate that they regard the price movement as the best single index of business activity. Other writers, though in agreement, so far as one can observe from their statements, concerning the time relation, regard special price groups, and not general prices, as significant for an understanding and interpretation of the business cycle. Carver's theory, for instance, is a theory of dissimilar price fluctuations of producers' and consumers' goods. He seeks an explanation of business cycles in the principle that the value of producers' goods is determined not by the total value of their product, but by the excess of that total value over costs of production. A comparatively small change in a factory's selling prices will cause a larger change in profits and hence a large increase in the value of producers' goods. To quote: " A slight rise in the price of consumer's goods will so increase the value of the producers' goods which enter into their production as to lead to larger investment in producers' goods. The resulting large market for producers' goods again stimulates the production of such goods, and withdraws productive energy from the creation of consumers' goods. This for the time tends to raise the price of consumers' goods still higher, and this again to stimulate still further the creation of producers' goods. There is no check to this tendency until the new stock of producers' goods begin to pour upon the market an increased flow of consumers' goods. This tends to produce a fall in their value, which in turn produces a still greater fall in the value of producers' goods, and so the process goes on." [1]

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[1] J. H. Brookmire, " Financial Forecasting," *Moody's Magazine*, 16, p. 159.

[2] Charles Gide, *Principes d'Economie politique*, 10th ed., Paris, 1906, p. 158.

[3] *Currency and Finance.* " In 1875 I made a laborious reduction of the data contained in Professor Thorold Roger's admirable *History of Agriculture and Prices in England from the Year 1259*. I then believed I had discovered the solar period in the prices of corn and various agricultural commodities." Jevons goes on to relate that the " period " appeared to be thirteen years, and so convinced was he that he made an address in Bristol announcing the discovery. On further study, however, the thirteen-year period became very uncertain, and in another speech Jevons withdrew his statement.

[4] G. C. Selden, *Quarterly Journal of Economics*, February, 1902, pp. 293–310.

[5] *Ibid.*, p. 309.

[6] *A Study of Industrial Fluctuations*, London, 1915.

[7] *Ibid.*, p. 248.

[8] Paris, 1913.

[9] *Les Crises pėriodiques de Surproduction*, p. 21. The index numbers selected are for England, Sauerbeck's for France, that of March (based on import prices of 43 articles evaluated by the Commission on Customs Values) for Germany, an index number based on prices of imports at Hamburg (28 articles up to 1888, and 42 articles after that date) taken from *L'Annuaire Statistique de France;* for the United States an index number (based on the prices of 223 articles up to 1891, and 260 articles after that date) taken from the Bulletins of the United States Bureau of Labor Statistics.

[10] *Les Crises pėriodiques de Surproduction*, 1, pp. 5, 6.

[11] *Ibid.*, p. 6. Aftalion also distinguishes between " the cyclical fluctuations of price," and the secular trend, or " what we have agreed to call fluctuations of long duration which extend over several cycles." See pp. 6, 7.

[12] *Ibid.*, p. 8.

[13] *Ibid.*, p. 2.

[14] See p. 117, *supra.*

[15] See especially 1, pp. 105 *et seq.*

The special price group which has been most often set forth as having especial significance as an index of the business cycle is that of iron and steel. Baranowsky, for example, says: " The most characteristic circumstance of industrial fluctuations is the coincidence of the extremely regular movement of the price of iron with the phases of the capitalistic cycle; in the phase of prosperity, the price of iron is extremely high; it is extremely low in the phase of industrial stagnation. The prices of other products oscillate with much less regularity. That fact indicates the existence of a close tie between the conditions of demand for iron and the phases of the business cycle." [2]

Lescure holds a somewhat similar view.[3] He says: " The mining and metallurgical industry constitutes the infallible barometer of the general condition of the industry of a country. The price of pig iron, together with the figure of its production, constitutes one of the surest signs for appreciating the state of prosperity of a capitalistic economy." Lescure goes on to say that the prices of iron and steel do not rise alone. " By a phenomenon of repercussion " there is " a rise of the prices of clothing and food." [4] Underlying Lescure's whole treatment is a theory of " flux and reflux " of savings, a flow of savings into and out of industry, a consequent rise and fall of demand for capital goods, and a consequent " flux and reflux " of prices, especially those of production goods.

H. L. Moore, though finding the cause of business cycles in cycles of rainfall and consequent crop cycles, takes as his index of the business cycle the price and production of iron, " generally regarded as a good barometer of business activity." [5] Moore's conclusion is that the activity of general industry precedes the movement of general prices by about two years.[6] His general conclusion regarding cycles is summarized by him as follows: " The weather conditions represented by the rainfall in the central part of the United States and probably in other continental areas, pass through cycles of approximately thirty-three years and eight years in duration, causing like cycles in the yield per acre of the crops: these cycles of crops constitute the natural, material current which drags on its surface the lagging, rhythmically changing values and prices with which the economist is more immediately concerned." [7]

Perhaps the most detailed, and certainly the most downright, presentation of this view that the price of iron is of especial significance in the business cycle is that of Hull, in *Industrial Depressions, or Iron the Barometer of Trade*.[8] " We recognize," he says, " the due influence of everything which tends to increase or decrease the volume of the industries. We claim, however, that after a country has become chiefly manufacturing, no combination of favorable influences has been strong enough to develop a boom, *except on low prices of construction*, and that after high prices develop, no combination of favorable influences has been strong enough to keep the boom going beyond the time necessary to complete the volume of extra-construction made up of old, low-priced contracts. The necessities which come with war have at times prolonged a boom, but only as long as those necessities continued." [9] After examining in some detail statistical data bearing upon the " six depressions " which he names as occurring in the period 1833–87 in the United States, Great Britain, France, Germany, and Belgium, he reaches the following general conclusion: " It would be difficult to name any kind of occurrence or condition which affects business that did not take place during that period. But in all these numerous and varying conditions it cannot be discovered by the most careful analysis that the six depressions occurred in any one of these five nations with, or following, any one of these conditions, except high prices of construction, while this condition preceded each one of the six depressions contemporaneously in all the five industrial nations, with the same certainty that sunrise precedes sunset." [10]

In discussing the time relation between construction prices and general activity, Hull says that the belief that falling prices is among the chief causes of industrial depressions is a mistaken one. Its general acceptance he thinks is due to " the fact that the fall in prices of construction materials is the first occurrence which attracts attention, but analysis shows that it is not the first to occur. First comes the falling off in demand for construction materials, after which follows the resultant fall in prices. Hull then sets up a sequence of " five events " which follow each other at varying intervals, and are characteristic of the turn of the curve from " prosperity " to " depression." The following table illustrates this sequence for three different periods between 1898 and 1908:[1]

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[1] T. N. Carver, " A Suggestion for a Theory of Industrial Depressions," *Quarterly Journal of Economics*, May, 1903, p. 499.

[2] M. T. Baranowsky, *Les Crises industrielles en Angleterre.* (Traduit sur la 2e edition Russe revue et augmentée par l'auteur.) Paris, 1913, p. 252.

[3] Jean Lescure, *Des Crises générales et périodiques de Surproduction*, Paris, 1907.

[4] *Ibid.*, p. 414.

[5] *Economic Cycles: Their Law and Cause*, New York, 1914, p. 147.

[6] *Ibid.*, p. 147.

[7] *Ibid.*, pp. 148, 149.

[8] New York, 1911.

[9] *Industrial Depressions*, p. 217.

[10] *Ibid.*, pp. 158, 159.

PRICE MOVEMENTS AND THE BUSINESS CYCLE *

Economic Crises	1857	1864	1873	1881–82	1890–91	1900	1907
Maximum of Prices:							
All Commodities	1857	1864	1872–73	1881	1890	1900	1907
Production Goods	1857	1864	1872–73	1880	1890	1900	1907
The Maximum of Industrial Depression	1858	1867	1879	1886	1893	1904	1907
Minimum of Prices:							
All Commodities	1858	1869–70	1879	1887	1896	1903	1907
Production Goods	1858	1868–70	1879	1886–87	1894–97	1902	1907

* *Commission des Crises économiques, 1908–11; Rapports presentés au nom de la Commission, par MM. Georges-Cohen et Edmund Laurent, sur les Indices des Crises Economiques*, p. 22.

It will be observed that Hull's references are to " extra " construction, his point being that a certain amount of construction goes on at all times regardless of business conditions, the " extra " construction, that of shrewd investors who make contracts in times of depression in anticipation of a rising market, being the phenomenon which, in Hull's opinion, is chiefly responsible for the " wave movement " of business activity.

Another writer who seeks to establish the sequence of events in the business cycle is ex-Senator Theodore E. Burton.[2] Concerning prices, Burton reaches two general conclusions, (1) that prices are to be regarded as among the " preceding indications " of crises; and (2) that not all prices are significant to the same degree. The period preceding a crisis, he says, " is characterized by well-defined indications, some of which develop contemporaneously, but which, so far as they are distinct in time, occur in approximately the following order: an increase in prices, first, of special commodities, then, in a less degree, of commodities generally, and later of real estate, both improved and unimproved." [3] In a later place he states his conclusion regarding different sorts of prices more fully. " In the season of activity which precedes a crisis prices rise. This rise begins after the worst point in the previous depression has been reached. Attention has already been called to the fact that the rise in prices is unequal in different commodities. Iron and steel in their various forms, as well as other commodities required for construction, and those which supply new demands of consumption, show the most striking increases. During a depression prices of these commodities fall first and most notably. The prices of other commodities do not fall so much or so early. In the preceding season of expansion they do not rise so much, and, in their rise, as well as in their fall, they show, for the most part, only a remote effect of the activity or inactivity of the time." [4] Burton's conclusion concerning the time relation between general prices and general business activity is as follows: " It should be noticed that the high prices and activity which precede a crisis usually pass the zenith some months or even a year or two before the crisis occurs. Probably also there will be fluctuations in prices and in the demand for commodities sufficient to give warning. In later years there is a distinct tendency towards a longer interval between the date of the maximum of prices and the occurrence of the crises." [5]

It should be added that Burton's conclusions are based on a painstaking and elaborate examination of data; but that refined statistical methods are not used. Burton's conclusions regarding prices are apparently endorsed as a complete and sufficient explanation by R. W. Babson, since Babson's treatment of prices consists altogether of quotations from Burton's book.[6]

Finally, we present the view of Irving Fisher.[7] He regards price movements as the first member of a chain of phenomena, of which the rate of interest is the last, which together comprise the business cycle. Prices rise, culminate, fall, and recover. Interest rates experience a similar movement, but lag behind prices. On the rise, the lag means larger profits, hence extension of business by resort to bank loans, hence increased bank deposits (i. e., an increased quantity of credit instruments), hence a still further rise of prices, and so on. This process continues until the rise in the interest rate overtakes the rise in prices. Then loans cannot be renewed at the former rates. Failures ensue. Bank deposits are heavily drawn upon. Loans are curtailed. The rate of interest rises to a panic figure. Then follows the depression. Velocity of monetary circulation diminishes; prices fall; interest rate falls. But on the fall, as on the rise, interest rate lags behind prices.

This statement of the sequence of phenomena, though very brief and bald, is perhaps sufficient to indicate Fisher's view of the time relation among the various factors comprising the business cycle; and to indicate that in his view the fundamental factors in the business cycle are the price movement and the interest rate movement, the lag of the latter behind the former being responsible for the cycle. Fisher emphasizes the fact that the price cycle is the first and moving member of the business cycle. " A slight initial rise of prices sets in motion a train of events which tends to repeat itself. Rise of prices generates rise of prices, and continues to do so as long as the interest rate lags behind its normal figure." [1] In Fisher's view, however, the price cycle is not automatic. "The rise, culmination, fall, and recovery of prices . . . are abnormal oscillations, due to some initial disturbance. The upward and downward movements taken together constitute a complete credit cycle, which resembles the forward and backward movements of a pendulum." [2]

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[1] *Industrial Depressions*, New York, 1911, p. 114.

[2] *Financial Crises and Periods of Industrial and Commercial Depression*, New York and London, 1910.

[3] *Ibid.*, p. 51. [4] *Ibid.*, p. 223. [5] *Ibid.*, p. 55.

[6] See R. W. Babson, *Business Barometers for Forecasting Conditions*, pp. 344–354. [7] *The Purchasing Power of Money*, chap. IV.

A view essentially similar to Fisher's, though much less fully worked out, is that of the English economist, Alfred Marshall,[3] who accounts for cycles (" alternating periods of prosperity and depression of commercial activity") by maladjustment between price and interest movements.

It will be seen that the quotations that have been given are by no means exhaustive. They do not pretend to be an epitome of all of the views held regarding the rôle of prices in the business cycle. German writers on the subject, of whom there has been a considerable number, are not cited at all. It should be said, too, that comparatively few of the several works mentioned represent the results of elaborate statistical research, and in no case (except by Moore for crop yields and prices) have correlation methods been applied to the data.

Our purpose in this note has been merely to indicate that, notwithstanding wide differences of opinion regarding the precise function of prices — as to their time relation to other elements in the cycle, as to the question of the automatic character of the price cycle, as to whether all prices or only some special prices are significant — the point of common agreement which stands out from all the diversity of views is that price movements are a significant, and in the minds of most writers the chief, characteristic of the business cycle. It is safe to say that for no other single element entering into the general business condition could such unanimity of opinion be demonstrated. Dr. Persons' analysis points to the same conclusion, that prices constitute the best single series with which to compare all other series, the best single " standard " or " index " of business conditions.

Concerning the special questions that have been raised, as to time sequence, what prices to use, and the like, the aim of the Review, as will have been apparent, is to arrive at its conclusions by independent analysis, rather than by attempting a synthesis of the views of other writers. It is clear from Dr. Persons' articles, in the January number and in the current number of the Review, that reliable conclusions regarding the time relation between different series must depend upon the use of more refined statistical methods, applied to finer time units, than have heretofore been attempted.

JOHN H. WILLIAMS.

The Line of Secular Trend

Mr. Edwin Frickey of the staff of the Review has worked out the following derivation and explanation of the slope of the line of secular trend. That explanation will be given for pig-iron production, 1903–16. The annual figures are as follows:

Year	Pig-iron Production Unit, 10,000 tons	Year	Pig-iron Production Unit, 10,000 tons
1903	1743	1910	2685
1904	1613	1911	2333
1905	2259	1912	2938
1906	2479	1913	3072
1907	2531	1914	2305
1908	1562	1915	2966
1909	2540	1916	3902

The object is to secure a measure of the average annual increase in pig-iron production. Let us first consider the extreme years 1903 and 1916; the increase in pig-iron production between these years was 21,590,000 tons, or an arithmetic average increase of 1,660,000 tons per year. But a mean of a single pair of years is not to be depended upon, for it is quite possible that the pig-iron production for one or both of these years might be extraordinarily high or low; such a mean is not apt to give a correct measure of the annual changes for the entire period. Let us now consider the pair of years adjacent to the extremes, i. e., 1904 and 1915. During this period the increase in pig-iron production was 13,530,000 tons, or a mean annual increase of 1,230,000 tons. During the period 1905 to 1914 (to take the next pair of years) the total increase in pig-iron production was 460,000 tons or an annual mean increase of 50,000 tons. It is quite evident that we shall get different figures for the mean annual increase, depending upon what pair of years we take as our basis of judgment. Let us, therefore, not base our conclusion on any one pair of years, but rather upon pairs of years which shall include all the different years of the time period in question. The following table shows the general average

(Units of 10,000 Tons)

Terminal years	The total increase in pig-iron production	The mean annual increase in pig-iron production	Number of years in interval	Weight assigned to average for this interval
1903 and 1916	2159	166	13	13×13=169
1904 and 1915	1353	123	11	11×11=121
1905 and 1914	46	5	9	9× 9= 81
1906 and 1913	593	85	7	7× 7= 49
1907 and 1912	407	81	5	5× 5= 25
1908 and 1911	771	257	3	3× 3= 9
1909 and 1910	145	145	1	1× 1= 1
General aver.	....	114.2	....	....

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[1] *The Purchasing Power of Money*, chap. IV, p. 60.

[2] *Ibid.*, p. 70.

[3] *Principles of Economics*, 5th ed., London, 1907, 1, p. 594 *et seq.*